

AVIATION WEEK

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NOV. 13, 1950

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Goodyear track landing gear on B-36

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LOS ANGELES



Aviation Week

Volume 53

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Shown on June 20, 1950, when a pilot shot a V-2 at Los Angeles.

CRASHING THE UNKNOWN!

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ment obtainable and—what is most important—the kind of creative thinking that is accustomed to meeting and solving the "unsolvable."



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*10
EXAMPLE PROJECTS

*10

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AVIATION CALENDAR

Nov. 14-ECMO visit of the air and air traffic control meeting, French session, Montreal, Canada

Nov. 23-Bi-Monthly Young Men's, sponsored by Elmer Auer Young Group, El Paso, N. M.

Nov. 26-Dec. 1-7) annual meeting, American Society of Mechanical Engineers, Hotel Statler, New York

Nov. 27-30-As part of the 1956 show year event by the National Air System Association, American Airlines and support for protection, Baker Hotel, Dallas

Nov. 29-Dec. 1-English annual meeting of Aviation Industries and Manufacturers Association, Los Angeles, Los Angeles

Nov. 30-January 1-English annual meeting of the Committee on Aviation and Japan Air System of the National Free Air Institute, New York, New York

Dec. 7-Bi-Monthly visit of commercial trade, American Airlines and support for protection, Baker Hotel, Dallas

Dec. 8-Visiting American show and show, Baker Hotel, Philadelphia

Dec. 11-14th Wright Brothers Lecture in the history of Aviation, American Airlines, Washington, D. C.

Jan. 27, 1958-Aviation Institute of America, New York

Jan. 27-28th Air Pilot's Year in the air and operations of planes and equipment, Ohio State Airport, Akron, Ohio

Jan. 31-32nd annual air show, Miami Beach, and other of Florida Air Pilot's Year

Jan. 31-32nd annual air show, and can current technology in the air, Cleveland, Ohio

Jan. 29-Feb. 1-1956 annual meeting of the Institute of Aeronautical Sciences, New York, N. Y.

Mar. 19-21-Bi-Monthly Western World Exposition, Oakland, California and Exposition Hall, Oakland, Calif.

Apr. 24-25-VIA annual convention and conference conference, Hotel Drake, Chicago

June 11-Bi-Monthly annual conference on industrial aircraft, conducted by Calum Air University, Dept. of Industrial Engineering, New York

Sept. 7-11-World annual Anglo-American Association of Civil Engineers, sponsored by Royal Aeronautical Society and IAF, Bedford, England

Sept. 10-14-World annual conference on conference and exhibit sponsored by International Society of America and American Airlines, Houston, Texas

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NAVYON AT SEA: Ryan L-17 Navion plays a new role in Korean operations as it leaves the deck of the escort carrier USS Badoeng Strait

Start to observe amphibious operations: Success of ground forces permitted the pilot to land alone, instead of on the water



News Picture Highlights

SWEDISH ROCKETEER—This second view of the Swedish SAAB J29 jet fighter shows up the sleek, rocket-like fuselage. Rocketry added here turns the jet into a rocket. The 600 mph. jet is powered by a J48 Jet. The Swedish Air Force has ordered 100. Most aircraft consists of four 20-mm. gun cannons.



MERCATOR TRI-Nav pilots try three kinds of flying a domain test at recently delivered Navion F-401 long range patrol planes

in service with VP-21, based at Patuxent River, Md. Two F-401s and two F-401s give an impressive performance

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INCONEL "X"

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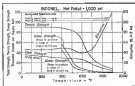
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WHO'S WHERE

In the Front Office

Fred T. Sarge has been named a member of the board and executive vice president of A. V. Roe Canada, Ltd., Mississauga, Ontario. He was previously managing general manager Sarge was Aero Canada's first manager, proving the company after World War II. During the war he held positions in the Canadian Department of Munitions and Supply, aircraft division of the Joint U. S. Canada Production Board, and was assistant general manager of Federal Aircraft, Ltd.

Raymond W. Young has been appointed vice president in charge of engineering at Reaction Motors, Inc., N. J., and has also been recommended for a membership on the company board. John Shasta was named vice president heading up research and continues as a director at RMI. Young was formerly vice president engineering at Curtis-Wright. Shasta is one of the founders of Reaction Motors.

What They're Doing

Leo G. Bards has been named joint controller in the general sales manager of Bendis Radio Communications division of Bendis Aviation Corp. Fred C. Wapold has been appointed production manager for Air Force Instruments Laboratory, Missoula, N. Y. L. A. Condon has been made engine engineer for Westborough Aircraft, Westborough, Mass. The division has appointed as new field and service representatives H. W. McCracken, N. Y.; D. R. Reed, Ohio; D. F. Fenn, Connecticut; F. L. Melnick, Washington; J. F. Colton, Los Angeles; and E. K. Whitely, Seattle.

Howard Holman has been made general manager of development for American Aeromarine, N. Y. The new aircraft manager for the firm is G. J. McCord. Norman L. Witten has been appointed director of special electronic units for Space Systems Co. E. Van Vleet has been made manager of sales and marketing at the Climatic plant of General Aircraft Co. C. M. Berman has joined Lockheed Aircraft Service as manager of processing and repair. David Stone, formerly at American Aeromarine Associates, is now general manager of a new aviation unit which the Air Force has at NAVAIR, Westboro, Mass. Allen A. Christian has been appointed Washington, D. C. consultant at New Direction's division of General Motors.

Honors and Elections

J. H. Cusack, president of Capital Aircraft, has been awarded a plaque by the Washington Board of Trade for his outstanding contribution to the transportation industry by introducing its aircraft to school children.

Edith E. Korte, president of Executive Products, Inc., Rahway, N. J., has been awarded by the company its recognition of 25 yrs. of service with the company.

INDUSTRY OBSERVER

► Canair, Ltd., after building one F-86A jet fighter, will not make any more F-86s until it gets complete engineering designs and data from North American for the later F-86E model of the fighter, which will be the production model for Canada.

► Titanium will be used for an experimental guided missile wing and for the complete aft fuselage section of a jet fighter, as experiments at Air Materiel Command's laboratory, Dayton, indicate and also will be the wing. High strength-to-weight ratio of titanium and its heat-resistant qualities are advantages which indicate it will be a primary aircraft structural metal, whenever supply is stepped up and price drops. Large-scale production is expected to bring unit prices down possibly to \$1 a lb.

► Vore is considering new powerplants for the Douglas FTD night fighter, which may center on a new engine, underdevelopment with its present two Westinghouse J-34WE-35 engines, rated at 3600 lb. thrust each.

► Two latest tests of the bicycle landing gear of a Martin XB-58 were blown out in a test landing on the runway of the Martin plant a few weeks ago. Design was confined to the tires and to two thin patches. Plans now flying specify a few days later.

► Next step in large military night helicopter development will be to redesign engine assemblies. Several proposals in the recent subcommittee and Air Force research committees suggested twin engines, but both Air Force and Navy settled on single engine designs. Bell and McDonnell's experimental prototypes and the big P-500, not yet completed, are the only twin-engine units announced as far as this country. A twin-engine machine which would have about 15 to 20 tons may be the next step up in size.

► An experimental P-500 C-119 Packet powered with Wright R-3300 engines, instead of the Pratt & Whitney R-4000 powerplants now standard, may mean a switch to powerplants for the military cargo plane.

► A language fighter-bomber version of the upcoming North American F-106, a further entry in the ground support category. It will be loaded with four external fuel tanks in addition to its regular internal capacity, and will carry a heavy armament of either rockets or bombs. It will also be quickly transformable to its original air intercept fighter role.

► Beech Aircraft has delivered its 15th Model 18 two-seater to the Netherlands government civil flying school, for two-engine pilot training. School provides pilots for Netherlands Air Force and KLM Royal Dutch Airlines.

► Aircraft companies are looking hopefully at the Eastern plant at Columbus, adding the Curtis-Wright plant which North American Airlines is taking over. If KFC lets go of the Eastern facility built in World War II, it may be occupied by aircraft production again. War Production Board at the end of World War II recommended that it be held available for aircraft production if needed.

► Aircraft Industries Ann has been supplying Department of Defense with weekly reports from principal manufacturers on cost data, in an effort to keep a close check on rising parts and accessories and materials costs.

AVIATION WEEK

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AF Shopping for Troop Support Bombers

XB-51, B-45, AJ-1 and British plane are chief entries in evaluation.

By Alexander McSweeney

Substantiated new Air Force production contracts will be the result for the winner or winners of the light bomber competition now on its early stages. Four planes are involved in this examination of low-price troop support craft.

English Electric Co.'s Canberra Mark III, the outstanding high performance British light bomber, is a dark horse competitor in the evaluation, against such American entries. There are:

- **Martin XB-51** shopping three jet bombers.
- **North American B-45** four jet bomber, now in service.
- **North American AJ-1** composite-powered Navy attack bomber.

An Air Force pilot, including Brig. Gen. AJ Boyd, commander of 44th AF, Maui, Calif., have already flown a preliminary testing program in the Canberras in England. But it is understood that one of the planes will be brought to this country for further flight tests.

• **B-45 Service Evaluation**—The North American B-45 will be evaluated in the line of its performance in service, since it is the only one of the four planes which is now flying in squadrons for the USAF.

There are two XB-51 prototypes now flying, DC-6 or possibly both of these will be used for the evaluation, either at Eglin AFB, Fla. or at Edwards AFB.

Air Force pilots were expected to make a preliminary evaluation of the AJ-1 now, possible at the Western Flight Test Base at Dayton, Ohio.

• **Canberra Competition**—Preliminary reports indicate that the Canberras will probably get a favored contract and that one of the three American planes will get the rest.

The venerable Martin plane which has a variable incidence wing, was up officially designed as a low-level troop support bomber for operation out of advanced bases. Although it made its first flight a year ago, Martin has now received an additional order for over a service test quantity. This is probably due to the fact that Air Force was placing its primary emphasis on strategic bombers and interceptors, and putting the tactical types of planes well down



MARTIN XB-51—Climbing in popularity among Army officers seeking ground support plane.



CANBERRA—Dark horse with light performance is an odd-on favorite in Pentagon.

in the priority list. Now that picture has changed.

• **Army View**—Army officials have indicated they like the XB-51 and would like to have it or something like it for their troop support work (Warner Week Oct. 2). They have recommended that, if it cannot be procured, certain design features of the plane be incorporated into the B-45, a composite production light bomber.

The Air Force interest in the AJ-1 Navy composite bomber is a possible alternative for the troop support role, but has been kept quiet. But such performance reports on the first AJ-1 is now going into carrier service have caused the Air Force to take a good look at it as a troop support plane. The concept of the first composite the AJ-1 came two patterns—Pitt & Whitney RB350 for its main engine. Though the pilot can lock up the speed to around 300 mph, will it faster maximum performance, will it 400 mph, when he flew up an Altus F-33 jet engine in its tail for combat (Warner Week Nov. 6).

There are approximately 110 North American B-45s now flying for the Air Force. The plane has been developed

considerably beyond its early capital cost, particularly as to range by addition of external tanks and other modifications. The airplane is currently out of production.

Here are brief thumbnail descriptions of the four contenders:

• **Canberra** Mark III. A two-jet plane powered with Rolls-Royce Avon engines rated at around 7500 lb. thrust each. Dimensions are: span 64 ft., length 55 ft. 6 in., height 15 ft. 7 in. Gross weight and performance data have not been made available, but the plane is fast, will up above 500 mph, and extremely maneuverable for its size. Its standard demonstration includes most tactical flight maneuvers. Besides large (winged) fuel tanks, it can be fitted with large wingtip tanks to extend range. It flies well, too, at slow speeds, below 100 mph. It was originally designed as a leader bomber for 50,000 ft. altitude operations, but has proved capable instead for low-level operations.

• **North American B-45**. Powered with four GE J-47 axial-flow turbojets rated at 12000 lb. thrust each. The straight-winged B-45 is capable of speeds in the 570-mph. range and has a tactical radius



NORTH AMERICAN AJ-1—Navy-powered, but it looks good to the Air Force anyway.



NORTH AMERICAN B-45—Out of production, but in the running for large new contracts.

of over 500 miles. Gross weight is about 42,000 lb. Wingspan is 65 ft. 6 in., length, 74 ft., and height, 15 ft. The plane is fitted for wingtip tanks, thus greatly extending its present range, while some of the planes that are now in service have been modified for photo reconnaissance work. It carries a crew of four.

• **Martin XB-51**. Powered with three GE J-47 turbojets rated at 12000-lb. thrust each, the XB-51 is the latest of the entries in the evaluation with a top speed reported over 600 mph. Gross weight is about 45,000 lb. Wingspan is 51 ft., length, 60 ft., height, 17 ft. Wing and tail have about 35 deg. sweep-back.

The angle of incidence of the wing can be changed by a mechanism controlled from the cockpit. When leading gear is a tandem installation in the fuselage consisting of two pairs of wheels, while main landing gear is retractable into the wings. Two engines are mounted on pylons extending from the fuselage just below the wing. The third engine is mounted in the tail of the ship. The plane carries a crew of two.

UAL Sues Douglas for DC-6 Crashes

Two United Air Lines' suits against Douglas Aircraft Co. for a total of \$9,724,365, in New York State Supreme Court, have recently been declined. They allege that deficiencies in four-engine Douglas DC-6 airplanes were factors responsible both for the 1947 Ryan Clayton, Utah, and also the 1948 Mt. Carmel, Pa., United accidents.

United filed the first suit for \$6,526,000 Oct. 22, 1948. UAL says its DC-6s did not meet CAA requirements as to the fuel vent system. That result was the Ryan Clayton crash, United said. UAL claims Douglas admitted that when it later changed the vent system on all DC-6s, providing the planes for no stronger of 171 days.

United filed the second suit June 6, 1950, for \$3,298,365, alleging that when Douglas modified the planes after the grounding, it made several changes that eventually caused the Mt. Carmel crash.

Douglas denies formal or legal responsibility for the accidents. Douglas points out that DC-6 is one of world

wide service and to date have logged more than 12 billion safe passenger miles.

Civil Aeronautics Administration certified new Douglas without criticizing the possible design of the DC-6 fuel vent location. Thus, CAA says, was to leave the fuel vent location that had no new problem on the aviation was not an apparent flight procedure, and so was not discovered during regular flight tests.

United Air Lines is the only airline using Douglas on the DC-6 matter, although often lost money during the DC-6 grounding. CAA, in granting remedies and pay amounts, put in a clause providing that the bulk pay would be effective only if other sources of compensation in the crash were exhausted.

NAC Awards

National Air Council scheduled its delayed 1959 awards to two members of the Air Force and Navy Bureau of Aeronautics for presentation Nov. 8 by Defense Secretary Marshall at the Pentagon.

Awards went to:

- **Capt. James L. Hight, USAF.**
- **Rear Adm. Colver M. Bolten, Navy Bureau of Aeronautics.**

Capt. Hight received his award for "developing a basic multi-purpose and highly flexible aerial delivery system capable of delivering, ready for application, the capacity of rockets, artillery, antitank and air-to-air weapons" for Air Force airborne divisions.

Adm. Bolten's award was for specific projects which a war was declared due to security reasons.

Nichols Named As OGM Deputy Head

Maj. Gen. Kenneth D. Nichols, vice director of the Atomic "Manhattan Project," last week was named deputy director for Defense Department's new superagency. Officer of General Nichols, commanding an earlier story (Oct. 5) in *Aeronautics Week* of the expanding appointment.

Gen. Nichols was drafted at Aeronautics Week Special Weapons Project and senior member of the Military Aeronautics Committee to the Atomic Energy Commission prior to this assignment. He will be deputy to R. C. Keller, named Oct. 24, by Defense Secretary George C. Marshall to direct the committee of this nation's global nuclear development and production.

Nichols will set up the actual operating machinery of the new office while Keller as director will serve on a part-time basis in an advisory capacity to Secretary Marshall.

Washington Roundup

Navy Build-up

In possible reinforcements during the reorganization process, Chairman Carl Vinson of the House Armed Services Committee has urged Chief of Naval Operations, Adm. Forrest Sherman, and Deputy Chief of Naval Operations, R. M. Vance, to plan for a "big bang" in the Navy's build-up. It would mean procurement of about 600 additional new aircraft.

The plan will most be opposed by the Joint Chiefs of Staff, the Secretary of Defense, the National Security Board, the Budget Bureau, and the White House before it will be publicly disclosed. But whether it's approved by the Administration or not, Vinson will push it as the new Congress is the task of the year. The odds, by past performance, are that he will put it across—despite any political opposition.

Pearl Harbor Navy?

Vinson's determination to push the Navy build-up, came after Adm. Sherman's report that the Navy's budget as set for next year will be only slightly greater than its Pearl Harbor 1941 level. On June 16, 1951, the Navy, under its present program will have 396 operating aircraft—a slight margin of some 250 planes more than the 1941 air disposition on Dec. 7, 1941.

"It shows enormous lack of," commented Bureau of Aeronautics chief, Rear Adm. A. M. Proke. "We've grown used to living with a deteriorating aerial war time."

Modest Expansion

An fleet, with Administration approval, is looking up to the 70-group program—now called "the 68-group program"—recommended by the Joint Chiefs of Staff and the Congressional Air Policy Board.

The new proposed program for the Naval Air Arm will call for a fleet of 68 squadrons of the Congressional Air Policy Board for a Naval striking force of 14,500 air craft. It would increase the Navy's large attack aircraft force from the one now programmed to 12, and build up the number of operating aircraft from 541 to 7190. This is how it would look: Navy's air striking force

- Carrier Air Groups: 12 now programmed, this would be increased to 16.
- Marine Air Squads: 15 now programmed; this would be increased to 24.
- Patrol Squads: 27 now programmed, this would be increased to 34.
- Anti-Sub Squads: 10 now programmed, this would remain the same.

Foreign Mail Pay

Senate Intelligence and Foreign Committee Committee is working on an "apparently" to authorize air and service pay from industry over international routes.

The Committee's chairman, Sen. Edwin Johnson, has not returned the proposal to its subcommittee. From 1946 to 1950, the rate of \$7.85 per ton-mile at the average rate. Under this, for one year—ending Sept. 30, 1949—studied by the committee, American Airlines would have been charged \$74,000, Pan American Airways, \$151,080, and Trans World Airlines, \$731,030.

The Carrier—Always?

Even if the statute is perfected for future use, be continued, "it will find its most application with carrier-based planes. They will be able to strike at the enemy with greater speed than a more distant base than the carrier can do. The aircraft carrier is going to remain the heart of the Navy for the foreseeable future."

"Super" Carrier

Navy is trying to work away the "super" and "big deck" designations being into its proposed carrier, the United States, whose construction was cancelled. The new fast-deck carrier the Navy is pushing, though, would be about the equivalent of the United States.

But it has already gained substantial support because of Sherman's emphasis on its maneuverability—as past as any carrier now on the sea, and its potency for tactical operations. Navy now disclaims that it has any intention of using the new fast-deck for strategic bombing.

It highlights that it will be able to use the new carrier for tactical support by high-powered jet fighters about 400 miles distance from its own target, compared to the more 300-mile range for present carrier-based planes.

Jet Limitations

Under the Navy's new fast-deck ship is approved, manufacturers will have to build both jet and propeller-powered aircraft for use on the same carrier, according to Adm. Connelley. "Our present type aircraft cannot adapt and service the very first jet aircraft now on the drawing boards of manufacturers. Unless the new carrier is authorized, we'll have to lay down limitations on manufacturers on the types of aircraft we can produce."

More Procurement Money

An F-100 has acquired several hundred million dollars more for procurement this year to all pilot cost. The request is before the Secretary of Defense. The increase is not meant any build-up, simply make possible the present 68-group program. Navy's budget hasn't asked for an increase in procurement funds to offset more jets. "But it looks to me that we will have to," Adm. Proke commented.

Excessive Rail Rates

Railroads have succeeded in getting Interstate Commerce Commission to recommend legislation which would stabilize Justice Department's suit to require carriers not charge on aircraft and parts shipments.

At ICC's request, the chairs of the House and Senate Interstate and Foreign Commerce Committees introduced the measure.

It would also authorize excessive and rates on aircraft and parts in the future.

Aircraft Industries' plan estimates that manufacturers are now "overpaying" upwards of \$15 million a year in freight rates—paid on to Air Force, Navy and the airlines in plane parts.

"This legislation is so necessary," ATIA's chief executive lawyer commented, "that I think we will be able to help it single-handed—once it has been put to help."

PRODUCTION

AF and Industry Study Production

Los Angeles meeting this week will review the joint program designed to improve manufacturing methods.

By William Kruger

Defense—the aircraft industry this week will get together with the Air Force Planning Section of Industrial Planning Division to material and manpower savings that can be achieved by using manufacturing methods now in the experimental stage.

These methods, being developed under sponsorship of the Manufacturing Methods Branch of the Industrial Planning Division of the Air Materiel Command, promise cost efficient use of the economic factors of production, especially in the event of mobilization. At a Nov. 17 meeting in Los Angeles of the Aircraft Industries Ass'n's Tech. Staff Study group, the Manufacturing Methods officials will report to representatives of West Coast manufacturers what has been done so far, progress suggested by AIA as well as review MMB's overall program.

Good Results—The Manufacturing Methods Branch now is in its third year, with some good results evident. It started in late 1947 with two projects, one to use laser strategic materials in jet engines and an investigation of a coordinate setting machine for tooling.

• **Potential Saving of 1100 lb of steel** in the manufacture of a propeller blade by extreme control of machinery and tooling.

• **Potential Saving of \$12 in material and manpower** on a subsonic electronic tube which now costs \$30, under full-scale mobilization, this could amount to a total of \$348 million.

• **Saving of 20 percent in time** in jet engine adjustment by using an optical positioning method.

• **Clearing House—The Manufacturing Methods Branch** is effecting a clearing house for tooling information available in the industry.

The Industrial Planning Division has found in some instances that Materials Branch might be calling for tools to do a job that could be done by Manufacturers, it, who might have different tools. In some instances tools have been found outside the manufacturing industry. So the Manufacturing Methods Branch studies such a situation to determine possibilities of new tooling concepts that may be best for the job in future planning.

This concept has also been utilized in the past, which previously led to the establishment of the Air Force plant manufacturing plant at Dayton, which (Aviation Week News, A-14, 1948), the clearing example of what the Air Force is trying to do. It is here that a potential method of manufacturing propellers is under development.

MMB engineers studied the manufacturing operations in cooperation with the Curtis Propeller division of Curtis Wright Corp. where, with the last methods known and highly skilled technicians, it was necessary to start with a 1100-lb piece of steel to produce a 280-lb, 10-ft blade. MMB technicians worked in the design of dies, and, working with the Curtis people, succeeded in squaring a 480-lb, subsonic propeller (which through a \$500,000 press and produced a 280-lb, 10-ft blade).

The result:

• **Finalized saving of 1100 lb of critical material.**

• **Elimination of possibly 75 percent machining.**



AVRO CANADA FILLING INCREASED ORDER FOR CF-100

Order for an additional number of CF-100 Canada's largest fighter has been given by the Canadian government to A. V. Roe.

Canada Ltd. as part of new defense equipment. The first order was for the first of the aircraft, but subsequent orders have increased.

The figure continues. Photo shows a section of the A. V. Roe plant at Malton, near Toronto, in CF-100 production.

• Time-saving in elimination of about 175 in of welding.
• An extension time of about 15 seconds, as opposed to the hour it takes to produce a blade by conventional means. This means a reduction in lead time vital to sustaining productive capacity.

About 40 extended blades have been produced to date experimentally and Curtiss now has a contract to produce 180 jet blades by this extension method.

The Research Planning Section is working on reduction of both manpower and materials in manufacturing. So it deals with development of both products and processes to do more of the actual work itself. All it does by in-house under contract is through the Procurement Division of AMG.

The actual program is still too new for detailed cost analysis. Cost reduction will flow naturally from decreased manpower and material requirements.

Reduced Manpower Needs—Perhaps the most important attainment will be reduced manpower requirements, or, to be exact, reduced requirements for highly skilled manpower. Maj Adams points out the terrific complexity in production of electronic systems which require, even for simple production, personnel with training far above skilled standards. And in case of full-scale mobilization there just wouldn't be enough of such people. Projects are aimed way to stabilize these phases of electronic production.

About the same reasoning applies to materials.

That the methods being developed under MMBS sponsorship will save mobilization costs for the Air Force is plain. What this costs to the service however is not so clear at the moment. If a manufacturer has an incentive-type contract whereby he retains part of his savings on the "big" price, he may tend to stop greater profits. But the factors of extra profits tax and reorganization have to be considered.

MMBS does not interfere with a manufacturer's cost and profit and proprietary rights. The general manufacturing development contract of the Air Force contains a provision that any patents arising from work on the contract become the property of the government and can be made available to all industry.

MMBS has had no occasion to deal with the proprietary rights angle. For the entire manufacturing methods program is voluntary. The Military Establishment probably cannot enforce compliance with manufacturing on penalty of loss is neither willing nor ready to do that since it is recognized the competitive enterprise will seek the proper level of property encouragement.

Projects—The effectiveness of the voluntary approach is attested to by the close cooperation with AIA. About two years ago, the manufacturers, through AIA, submitted to MMBS a list of newly 150 projects it would like to have in progress. After discussion, the list was narrowed down to 10 for actual processing. They are:

- Precision chiseling of large turbine parts, suggested by Bell.
- Non-destructive weld tests, offered by Bendix.
- Electronically-controlled boring and drilling, suggested by Boeing.
- Machine to cut impellers from plastics, suggested by Boeing.
- Stretch measuring device, suggested by Boeing.
- Hydro-forming, suggested by Douglas.
- Stretch leveling, suggested by Douglas.

• Simultaneous tapering and contour forming for sheet stock, suggested by Ford.

• Long distance measuring device, also offered by Ford.

• Welding of heavy aluminum, suggested by Lockheed.

• Prevention of distortion when annealing, also offered by Lockheed.

• Electronic assembly production checker suggested by Northrup.

• Countersink head screws and rivets, suggested by McDonnell.

• Die quenching, suggested by Northrup.

• Cold-chamber die casting material, suggested by Northrup.

• Pre-welding treatment, also by Northrup.

• Stretch-forming of tapered stems, suggested by Ford.

• Machine steel tapered shaft, offered by Ryan.

Lockland Expands

General Electric's jet engine manufacturing facilities at Lockland, Ohio, are in for a big expansion. The company is planning to procure additional undeveloped space there and is moving extensive work and engineering staff from Lynn to Ohio. Although management states that present expansion at Lynn and nearby Everett, Mass., will not be changed by the transfer, the decision indicates that Lockland is slated to become the focal point of GE's future jet operations.

Additional space to be obtained at Lockland has not yet been fully decided. The former Wright Aeronautical-operated plant is now owned and partly occupied by the Fletcher Aero-Lite Corp. and is shared by GE, Aero-Lite and Seaquist Division. GE has been producing engines there since February, 1949, shifting nearly 200 subcontractors.

AF Invitations

Bids opening are 25-30 days after agencies make cost data shown in the following bid proposals. Bid acts containing modifications for time to be processed will be sent to qualified applicants who acts bid aviation number.

One bid act will be suitable for comparison without obligation by prospective bidders, after bid submission date at each of the seven AFSC procurement field offices. This will enable least to an specification before writing or telegraphing for their own bid act.

Procurement field office locations: Boston Army Air Station 15, West, Government Aircraft Plant No. 5, P. 1, West 1, West, 35 La Salle St., Chicago 1, West Performance, AFSC, Dayton Ohio West, West, West, West, West, Detroit 12, 151 W. Washington, E.H., Los Angeles 67 Broad St., N.Y. 4.

Advanced AFSC—10 each, bid invitation No. 11-441, issue date 1 Nov., delivery within 10 days after date of award.

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Our Valve Division Plant at Battle Creek, Michigan is equipped with highly specialized Eaton-developed facilities for the production of Jet Engine Compressor Blades



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2068, 2070, 2072, 2074, 2076, 2078, 2080, 2082, 2084, 2086, 2088, 2090, 2092, 2094, 2096, 2098, 2100, 2102, 2104, 2106, 2108, 2110, 2112, 2114, 2116, 2118, 2120, 2122, 2124, 2126, 2128, 2130, 2132, 2134, 2136, 2138, 2140, 2142, 2144, 2146, 2148, 2150, 2152, 2154, 2156, 2158, 2160, 2162, 2164, 2166, 2168, 2170, 2172, 2174, 2176, 2178, 2180, 2182, 2184, 2186, 2188, 2190, 2192, 2194, 2196, 2198, 2200, 2202, 2204, 2206, 2208, 2210, 2212, 2214, 2216, 2218, 2220, 2222, 2224, 2226, 2228, 2230, 2232, 2234, 2236, 2238, 2240, 2242, 2244, 2246, 2248, 2250, 2252, 2254, 2256, 2258, 2260, 2262, 2264, 2266, 2268, 2270, 2272, 2274, 2276, 2278, 2280, 2282, 2284, 2286, 2288, 2290, 2292, 2294, 2296, 2298, 2300, 2302, 2304, 2306, 2308, 2310, 2312, 2314, 2316, 2318, 2320, 2322, 2324, 2326, 2328, 2330, 2332, 2334, 2336, 2338, 2340, 2342, 2344, 2346, 2348, 2350, 2352, 2354, 2356, 2358, 2360, 2362, 2364, 2366, 2368, 2370, 2372, 2374, 2376, 2378, 2380, 2382, 2384, 2386, 2388, 2390, 2392, 2394, 2396, 2398, 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3064, 3066, 3068, 3070, 3072, 3074, 3076, 3078, 3080, 3082, 3084, 3086, 3088, 3090, 3092, 3094, 3096, 3098, 3100, 3102, 3104, 3106, 3108, 3110, 3112, 3114, 3116, 3118, 3120, 3122, 3124,

AERONAUTICAL ENGINEERING



PACK PLANE

in Fairchild's high utility design combining large detachable fuselage with quick-turn-around carrier. Gap between the two is closed by inflated down-haul-type seal. Craft is logical progression of C-12 and C-119B.



LONG

pack section about 58 ft. overall, about 17 ft. between hinged doorbells. Wheels detach easily.



SPACIOUS

original has about 2700 cu. ft. of volume. Chute lifts give easy front-end loading.

How XC-120 Pack Plane Is Engineered

Simple hookup plan for carrier and detachable pack extends usefulness of "flying boxcar" concept.

By Irving Stone

The detachable fuselage XC-120 Pack Plane opens a vast potential of utility in the field of air transportation, both military and commercial.

Though the specific questions around cargo concept represents a radical departure from conventional methods of air freight, the roots of the design go back to proven configurations for truck utility.

► **How Idea Evolved**—Original design, member of the Fairchild Engine & Airplane Corp.'s XC-119 is the true progeny's C-119 Packet, which introduced a new high in the utility scale. The "Flying boxcar"—actually an aircraft

built around a large cargo space—gave a substantially rectangular, unobstructed, end-loading 2512 cu. ft. room in two compartments (trucks, tanks, bulk tanks and other bulky units without necessity for dunnage).

Next step in the progression to the XC-120 was the C-119 Packet, also embodying the C-119 Packet configuration, but a larger, heavier craft allowing more cargo volume (2700 cu. ft.) and greater speed.

Because the boxcar principle of these planes was so successfully fitted for conditions into a carrier and detachable loading (pack) arrangement, the C-119B evolved into the XC-120 with a minimum of design changes. The

Pack Plane is another classic example of how one good basic design can be adapted and improved for still higher utility.

► **Costs Cut**—Design concept of the XC-120, as well as the C-119B and C-119, originated with Arnold & Thielen, Fairchild Aircraft division's chief engineers.

Work on the XC-120 design was begun in Fairchild's Westborough, D. C., office on Jan. 1, 1948, under supervision of project engineer James A. Shattuck, who heads the development program.

As many parts as possible were carried over from the C-119B to cut design costs, utilize same tooling, and promote interchangeability. Approximately 3100 new detail drawings were added to about 3300 of the C-119B. The latter in turn, incorporated many

Marquette Announces New Electric Aircraft Windshield Wiper with . . .

*Automatic Blade Parking and Locking!
Big Saving in Weight!*

The new Model V22E is the first electric stretch windshield wiper to automatically park the blade out of the line of vision and lock it in that position.

Pilots are quick to appreciate the safety and convenience of this important feature.

This newest model (illustrated at right) is the only modern electric wiper to successfully pass the rigid test requirements set by Armed Services. It has been approved for installation on all types of aircraft having glass windshields, including our modern jet fighters.



Illustrated above is the Western Converter Unit—the "heart" of the new Model V22E. It is extremely compact, and weighs much less than other electric wiper assemblies.

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of the C-42 drawings, and then the drawings were progressively from the metal house design.

In relation to the C-119B, the NC-120's outer wing in the area, the outer wing mounted but locally lower fin and middle ends were added to the two houses (in on the C-42). A dorsal fin is mounted on the house for added stability.

Stabilizer, elevator, and upper fin and middle are redesigned. Bottom half of the pack is the same, while upper portion is slightly modified. Cargo release remains identical, and tailwheel fittings are unchanged.

► **Final Vehicle**—The Pack Plane is not advanced to the final stage in the re-usable aircraft fuselage scheme. It is merely a preliminary step to probe the possibilities of the fuselage plan and supply answers to the numerous design and operational problems that must be solved out before production is deemed feasible.

More development work remains and no conclusion can be drawn now as to whether the plane will be used in this specific configuration for military or commercial service, even though the civil has demonstrated its fundamental feasibility in some test flights. Flight tests and numerous loading demonstrations since it first took to the air on Aug. 11, 1949.

► **High Utility**—Even at this stage of development, the Pack Plane scheme indicates a degree of adaptability that appears limited only by the imagination. There are some of the advantages:

- It will increase the airplane (aircraft) utility by almost double. It demonstrates how the craft for a considerable period during loading and unloading, so leaves airport congestion.
- Packs are cheaper than planes. Thus,



EXTENSIBLE before scales to core hatch



LADDER FOLDS to compact fit, and



HOOKUP between center and pack is by compact pad and ball fittings (shown). Also seen are electrical hookup, hand cable, rear service hatch



PACK BOOK attached for attachment to the ball cable. Switch controls cable travel



CLOSURE is controlled by motor-driven operator standing in pack as he watches exactly pack alignment

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LANDING GEAR

■ quibit-type, with 15-ft. 7-in. wheelbase. Main and auxiliary units are equipped with load-sensing.

one plane could be combined economically with different pack types providing accommodation for engines, fuel, landing, machine shop, phone lab, hospital, headquarters, storage, radio station, pumproom, etc.

■ Special auxiliary packs could be used for extra equipment to afford temporary, advanced housing.

■ Packs could be loaded directly at an equipment manufacturer's machine, to reduce handling and transit time, cut handling charges. In this connection, packs could be designed for compatibility to permit highway towing by trailer truck. This, of course, would involve detaching the pack from its present approximate 10 ft. width to about 8 ft.

■ Non-strategy methods could be used for pack construction.

■ Packs could be designed for dropping by chute or skidding them in a landing area, and from a water touchdown onto a beach.

■ In commercial applications, thousands of materials could be shipped from men's aircraft to a ship or afloat in a single landing operation, the pack to be trucked to the airport for pickup at plane arrival, eliminating most inter-vehicle handling and storage problems.

■ Fuel ports could be fitted for specific drop-type systems required by the various industries.

■ Fuel Cables—Pack on the NC-130 has two large standard doors on front and rear to allow cargo passage in either end. Front/rear doors are cut in the rear fuselage as on the C-119.

Top of the pack is flat to match with the flat contour of the carrier.

For preloading under the carrier, the pack may be loaded or pulled by tractor via attachment to either of the front landing-type support wheels. The two front wheels are retractable and retracting. Rear wheels are fixed.

Off-center positioning of the pack under the carrier is no problem because the cable hooks in the latter have

revolving cleaves to take out of way.

■ Hooking—These are four independent, single-puller type on the underside of the carrier's crew nacelle.

One pair of the front pair is located just aft of pilot's seat, the other right rear cleave opposite aft of engine's seat. Rear pair on the crew nacelle are similarly oppositely located about 10 ft. aft of the front fittings, under the rear part of the wing cross-section.

All four load fittings in the crew nacelle are interconnected by a continuous chain and cable system to permit raising, locking and release by a manual control unit on the flight deck. This control also permits jacking down the pack in flight.

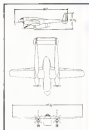
On the roof of the pack there are four ball-type fittings (steel, 1½ in. diameter, max. 2½ in. diameter) which mate with the suspended units on the crew nacelle.

All fittings are stainless steel, to resist corrosion. Front struts will take about 35,000 lb. vertical loads, rear right fitting, about 30,000 lb. vertical load and 25,000 lb. and down and side loads on left fitting taking lateral and side loads only. The rear fittings are stronger because C.G. of the pack is nearest the rear.

■ Flat Cables—At each winged fitting in the crew nacelle is a non-slip, spaced anchor and hook arrangement to raise and lower the pack.

Four cables presented a difficulty. Round cable could not be used because down size would be too large. A flat configuration of 7 x 7 aircraft steel wire, specially made by American Cable & Cable Co., solved the problem. Front cables are 1½ in. wide by 4 in. thick, rear are 2 x 4 in.

Cable pulleys on the front of the crew nacelle extend beyond the skin and are covered by doors. Cables are run pulleys, coast through the crew



THREE VIEW OF Pack Plane.

nacelle just aft of the wing rear spar. ■ Pack Hooks—The four hook bolts on the side of the pack are integral and locked. Integral small fasteners down front feet above the ground.

Alongside each pack hook is a switch to permit raising or lowering of cable.

When the pack is positioned for loading under the carrier, an electrical connection extending from the roof of the pack is plugged into a receptacle on the carrier. This gives electrical access to the pack for the cable switch, lighting, signals, and entrance functions from a source of external power or from an auxiliary power unit in the carrier.

The APU will supply sufficient power to raise a pack cargo load of 5000 lb. ■ Initial Regulation—Each cable bearing switch on the pack is thrown to the "down" position and cables are lowered from the pulleys on the carrier. When the cables pass over the carrier of the pack, there are plastic rubbing guides to prevent abrasion.

Cable speed-up or down to 2 ft./min., purposely made slow to explore the loading procedure in this experimental model.

When the cables have been dropped sufficiently to engage the pack hooks, connection is made and slack is taken up by holding the adjacent switch in the "up" position, the power being cut off automatically when 100 lb. of tension is placed on the cable.

Separation distance between pack and carrier, when hooking begins, varies from about 9 to 15 in., depending on fuel load in carrier and load in pack.

■ Add-on Control—When all four cables are tensioned to 200 lb., power is automatically transferred (signaled by a light) to a portable switch control, held by a radio operator.

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Pack Plane Basic Data

Ground	108 ft. 34 in.
Span	91 ft. 11 in.
Length	24 ft. 10 1/2 in.
Weight	
Design gross, pack on	64,000 lb.
Design cargo	20,000 lb.
Deck	
Length	91 ft. 11 in.
Height, on wheels	12 ft. 3 in.
Wheels	12 ft. 6 in.
Flare height, alone ground	
On wheels	2 ft. 5 in.
Attached to trailer	10 ft. 5 in.
Flare area	103 sq. ft.
Cargo volume	2700 cu. ft.
Normal passenger and luggage	44
Max. passenger seat space for	65
Litter accommodations	55
Length between chassis	
deck	16 ft. 11 in.
Inside height	7 ft.
Inside max. width at floor	9 ft. 2 in.
Center	
Length	10 ft. 6 in.
Max. width	10 ft.
Height	6 ft. 10 in.
Distance hatch height above ground	12 ft.
Engine, Two 7 & 1/2 ft. 4-cyl. 1250 hp	
Propeller, Four blade, 17 ft. dia.	1100
Max. forward	
Maximum speed	210 mph.

To get a good view of how the housing is progressing, the main inside center console slides a wall holder inside the pack, its head sticking through a roof opening directly under the main entrance flow hatch to the flight deck.

He moves the pack by passing a control button on the portable switch, and can use any one of four other buttons to adjust the corresponding set point to keep the pack's side deck parallel with the crew nozzle flow deck. When all bolt strings on the pack are connected so the crew's orange peel seatbelts, four green lights glow on the portable switch control (Pack can also be raised by hand-crank in crew nozzle).

Storage—Cables are then detached (severed by the individual bolt switches, disconnected from the pack's bolt fittings, then moved around the pulleys in crew nozzle. As the cable ends pass into the carrier they engage down to close the openings in the flight deck and wing.

With the pack locked in place, each ground crew is easily dropped by removal of a spring-loaded pin, and stored within the pack. Gap between pack and crew nozzle

is locked position is about 1 in. This is aided by rotating a tabular drawer type door on top and back by use of pump located at the rear channel.

Pin Grip—Locking mechanism for ball and wing-mounted fittings is simple. The ball handle on the flight deck is placed in the stand open position. As the ball fitting comes up and contacts the top of wing pin grip, it rotates the segments of the latter around pins to clamp the segments over the ball and also covering a roller on top of each segment to push out of a detent on the bottom of a spring loaded plunger.

This causes the plunger to drop, carrying a roller attached to it down to the track of a surrounding cylindrical case (around locked position).

The control handle is then thrown to the locked position, the crew harness quickly being rotated by a chain so that the crew nozzle (on the plunger) is placed in the clamping end of the crew track in a secure position.

For release, when all four slides have 100 lb. tension, the manual control handle is moved to the manual locked position, then to the release position.

Second Floor—The crew nozzle is composed of a nose section, crew compartment and equipment section.

The nose section extends forward from aft of the instrument panel and is hinged at the top to swing up for easy access to instrument panel.

Crew compartment, extending from instrument panel back to front spar of wing ramp-through structure, is entered through a trap-door type opening just aft of pilot's seat.

Access from the ground, when pack is set in place, is by a Fitch-Rising signed accordion-type aluminum alloy ladder, which hooks to crew compartment floor fittings. Collected, the ladder rises to about 1 ft. of vertical space under wing's table.

All of the cockpit on engine's side is the flight engineer's (crew chief's) seat. This slides on diagonal tracks to allow him to come into position between pilot and copilot so he can observe the instrument panel and controls. He has no separate panel station.

All of the flight engineer's seat is the navigator's station, and opposite on the left side of crew compartment is the radio operator's station.

Compact Arrangement—After this in the wing ramp-through structure, 144 in. deep, forming the floor of a short runway to the main's equipment section of the seat.

In the equipment section are eight 200,000 Ohm boxes, four on each side of the passageway, for the instrument and heating of the crew nozzle. There is also a small chemical tank (powered of heater) and a hydraulic pump for the engine operation and

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All of the knolls, in the center, is the auxiliary power unit. In the very end of the row axle is the life raft compartment.

Though the row axle has many uses, it is of great use, such as, water, table, etc., there is a single arm for use movement.

► **How Gas Evolved-Landing** gas compression posed a considerable problem.

A gas gun unit could not be used because of requirements for pack, in-movability from under center in a few in air direction, plus the fact that the bottom of the engine was too high for a strut of reasonable length.

A ball gas was not considered for the same reasons.

A track-type combination of main and motor gas also was ruled out because wheelbase would have to be limited by lack of room in the engine nacelle for storage of the released gas.

A gas-gun arrangement finally was selected, with separate structural supports for the auxiliary (main) and main units. Both extend aft into the engine nacelle and occupy a considerable empty section. Attention is by a motor-operated support.

► **Special Fitting—One** of the knolls in the gas design was a supporting strut in the vicinity of the engine mount. This was essentially a problem of placement to obtain sufficient clearance for one engine control without strut interference.

After considerable study, the strut was located outside the mount frame by use of a special "pusher" fitting. This arrangement in the engine mount allowed on top of the strut attachment point so that the knoll may be removed without disturbing the support strut.

Except for the upper dog links and all steering, main gas is same to that on the C-119B.

► **Wheel Steering**—The auxiliary gas extends forward under the front of Whistler R-4660 propeller. The gas was made available, with differential positioning between left and right assemblies to eliminate any dragging of the outboard wheels as a turn. Differing size varies with the radius of turn and may be as much as 20 deg.

However, the steering system was discontinued during early trials and it may be resumed the way because of the plane's favorable ground handling characteristics.

Auxiliary unit structure is covered with a wide band facing. Clearance between firing and the Blaudette Standard 154L, two-blade pusher-type propeller is about 9 in. The leading gear track is 29 ft 2 in. Wheelbase is 15 ft 7 in.



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In other words, the L-2 is both a stabilizing and maneuvering automatic pilot, operating on all three axes—roll, yaw, pitch, bank, climb, and descent.

HOW LET US DEMONSTRATE these facts (features of the Lear L-2 Automatic Pilot

the exhibition of everything flying. What does the automatic flight control of the L-2 mean to you, the private owner or business executive, who depends upon his plane to provide the maximum in safe, efficient, and pleasurable transportation?

It means that all you have to do is turn on the L-2 engine switch and then sit back comfortably for the entire trip, regardless of its length or the weather you encounter, without once touching the airplane controls except for the controls himself and looking. (As a matter of fact, the automatic of the L-2 is such that it will even take all and land your plane automatically, although it is not designed or recommended for this.) One long trip the constant automatic pilot and various other of naturally controlling your plane has your energy and mental interest to a considerable measure of relaxation, degree of freedom of the ongoing horizon by the L-2, you will remain physically and mentally relaxed for the time with the safe flying experience. You will be able to fly any route home a day then you are not before and still feel refreshed enough to go about your business when you land.

IT MEANS SMOOTHEST FLYING and consequently less turbulence for your passengers and greater comfort for yourself. In rough air or the L-2 checks the airplane's rolling, pitching, and yawing movements before they develop any appreciable magnitude. It means that while the L-2 runs your plane, you will be completely free to concentrate with your passengers, handle your radio communications, write down the weather conditions and write up, make notes in your position log, listen your ETA's, to pilot your plane on the short or long of bird weather, if fixed to your course.

on during after takeoff and before landing, keep a watch for other traffic, etc. And it means, furthermore, that you will be able to do all these things leisurely, unobtrusively, and accurately.

IT MEANS GREATLY INCREASED safety while you, moreover at low altitude and low speed in adverse weather conditions, steep banks, strong fields, narrow corridors, wind socks, etc. While your attention is outside the plane, the plane can be maneuvered automatically and safely in perfect time and constant altitude.

It means greatly increased accuracy in navigation. Most navigational difficulties are caused not so much by poor calculations as by the poor steering brought on by compass errors, rough air, unaided visibility, and pilot fatigue. The L-2 will hold an accurate course in the roughest air.

It means that you, by hand and eye, can go on as you are able to fly straighter, because you are able to hold your altitude and maintain heading speed more you have established them, and because you are able to maintain efficient constant time and distance.

IT MEANS COMPLETELY AUTOMATIC control when your plane is in the air. For example, in case of engine failure in the engine aircraft, the L-2 will instantly and not for the yaw due to unbalanced power and automatically hold the plane straight and level. An engine of a single-engine airplane equipped with an L-2 Automatic Pilot that it recently saved his airplane by taking over the flying when an engine failure during takeoff caught his full attention in preparing for his land.

The L-2 can sense the difference between life and death for the VFR pilot

accidentally caught off base in instrument weather. Although Lear does not recommend instrument flying with the L-2 unless you are properly licensed and equipped for such flying, it is a known fact that practically every pilot who has gone into conditions beyond his equipment and training. However, bad weather often takes the L-2 out of the L-2—it has just as well as some more modern in it done in CAVE. A test pilot flying a Bonanza equipped with a Lear L-2 Automatic Pilot is exactly what a real test pilot is. He was not a pilot in the world who can do as good a job on the "ground" as the L-2. Flying with the L-2 takes most of the "good" out of radar range problems, terrain, bracketing, and L-2 approaches. To

occurred, however, because the L-2 kept the plane in a constant attitude—in fact, on flat "C" pull-out.

It means greatly increased peace of mind while flying at night, which can also be transferred to the non-instrument pilot.

THE QUALITIES instrument pilot the L-2 has in many advantages at it for the less weather pilot. It corrects first of all relief from the strain and beyond dangers of prolonged instrument flying. With all that respect to your safety, there isn't a pilot in the world who can do as good a job on the "ground" as the L-2.

Flying with the L-2 takes most of the "good" out of radar range problems, terrain, bracketing, and L-2 approaches. To

change, rather you merely retain the "True" lead on the Controller. Your plane runs smoothly and unerringly, and stops turning exactly—but smoothly—where you want it to stop. To descend, you merely rotate the "Pitch" knob on the Controller for the desired rate of descent, and the L-2 will bring you down from the sky smoothly according to the book. "Holding" now is fly with the L-2 is actually dead. You do it just as the altitude decreases a minimum of effort and it exactly the altitude and position at which you are supposed to hold.

THE L-2 IS SIMPLE TO OPERATE, easy to install, and weighs less than 30 pounds (without gyro). The price of the L-2 is \$2000, and includes a set of excellent instructions and a manual gyro, which replace the ones you normally use for manual reference. The L-2 also contains provision for adding the Lear Automatic Approach Gyro and the Lear Automatic Altitude Control.

With the Lear L-2 Automatic in your plane your experience of flying will have no resemblance to anything you have known in the past. You will discover its interpretation at its best, an instant, and it will surprise you. You will certainly want to know more about this remarkable machine, so we have prepared a comprehensive book entitled *The Lear L-2 Automatic* which covers both its operation and functions in full detail. We make you need for your copy today—8c, or more.

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The L-2 is inherently easy to operate. Turn on the engine switch and your plane is under complete automatic control on all three axes in a turn. Simply rotate the "Turn" knob in the desired direction. Stop the turn by moving the knob back to the neutral position. To climb, just pull the "Pitch" knob forward. To descend, pull it backward. The L-2 can be easily incorporated by the pilot, and locked in the position by the flip of a flipper switch on the control knob. Automatic take-off control keeps the plane stationary in air on the pitch axis, thus avoiding unwanted, sudden conditions on the elevator whenever the L-2 is suddenly disengaged to permit manual flight.

THE L-2 STABILIZES YOUR PLANE AUTOMATICALLY

(Almost all modern planes have two three-dimensional approaches to better control, the L-2 provides automatic three axes control.)

When a gust hits and a wing goes down.



If an up gust hits the plane to rise or fall.



If the plane rolls by one or more degrees.



The L-2 prevents the wing from dipping below the right wing's normal altitude.

The L-2 prevents the wing from rising above the right wing's normal altitude.

The L-2 prevents the wing from rising above the right wing's normal altitude.

THE L-2 MANEUVERS YOUR PLANE AUTOMATICALLY



You get a complete automatic control on all three axes in a turn. Simply rotate the "Turn" knob in the desired direction. To climb, just pull the "Pitch" knob forward. To descend, pull it backward. The L-2 can be easily incorporated by the pilot, and locked in the position by the flip of a flipper switch on the control knob. Automatic take-off control keeps the plane stationary in air on the pitch axis, thus avoiding unwanted, sudden conditions on the elevator whenever the L-2 is suddenly disengaged to permit manual flight.



With the L-2 you can smoothly automatically control climbing and descending, turn—so fast you will appreciate yourself after taking out on landing approach.

The L-2 will hold your plane automatically in a safe, steady climb or descent, at the same time maintaining a level heading on a straight course.



Red Defender: MIG-15 Interceptor

Sweeping jet aircraft compares to USAF F-56 Sabre, but has edge in maneuverability and heavy armament.

(McGraw-Hill World News)

London—The milestone of a Russian sweeping, single seat fighter already in service has been confirmed by the British Air Ministry. Reports of several sweeping machines flying in Russia had persisted for months before the official announcement, and it is certain that at least one other fighter designed along similar lines is now ready for production.

The drawing here is based on a personal official three-view and two photographs.

The new fighter, an MIG-15 Interceptor, is revealed as a sleek machine, two-third-mechanized machine with aerodynamic lines in advance in any new jet fighter flying elsewhere. From one MIG jet was the MIG-9 two-seat low engine single seat of early postwar design, and a single jet "tail and boom" design flying in 1947 (pre warably MIG-15). Since Soviet flight can be inevitably altered old type new, and assuming the Russians skip the designation number 15, the latest MIG seems out as the type 15.

► **Sweep Swept-Back**—Mechanized machine has the photos indicate that the wing and tail sweepback is 85 degrees. The mainwing span wing has a slightly tapered, low-aspect ratio planform, giving a favorable lift area and landing, while having the sweepback and thereby, more necessary for low speed speeds. A large swept tip, two-piece outboard, and

sweep forward tail should provide good stability and control right up to the Mach one.

► **Powerplant**—Engine type is not known, but from the data, round fairings and the fact that the nose intake is divided to pass the air on either side of the cockpit, it appears that a centrally located jet is fitted. This would be a Uchevsky and based on the Rolls Royce Nene or Derwent.

With its inherent simplicity and moderate sensitivity regarding fuel-air mixture in comparison with good low designs this type engine should be well suited to Russian methods of quantity production. Even so, there seems little doubt that, like the American and British, the Russians are concentrating on jet-flow engines, though probably for different reasons.

Interesting noseport details are the large diameter of the nose intake, and the way the tail pipe is cut back beneath the vertical tail fin—presumably designed to reduce the stress on the tail surface.

► **Control/Armament**—Armament is apparently two guns in the front fuselage, one of 30mm caliber and the other 23mm. For more time the Russians have followed the German lead in firing shell guns better than the standard 20mm. European weapons, or the American 30 caliber machine gun.

Small caliber automatic weapons have been discarded on most new Soviet machines and replaced by 23mm and

30mm, cannon on fighters, and high velocity weapons up to 57mm, an arm of 150 mm Russian ground attack machines.

Another equipment feature of the MIG-15 is the fitting of an ejection seat. Seat options was laid out by the Russians several years ago, initially with the seat installed in the aft fuselage of a P-10 light bomber. There has been plenty of time for the seat to be perfected and produced in quantity for the Soviet jet.

► **Interceptor Use**—Range of the post-jet little fighter is likely to be short, as before its primary role as an interceptor. There seems to be little space for fuel other than just behind the cockpit and at the base of the wing root which are not taken up by the new engine/mount. The landing gear main legs fold inward toward the fuselage. The nose wheel is shown when the first landing between the engine.

Assuming the MIG-15 follows the Russian fighter tradition of light weight and small size, the combination of excellent speed, low aspect ratio and landing and takeoff characteristics should give it very superior climb, roll rate, and maneuverability. The Russians may be able to roll faster or turn tighter than the F-56 Sabre, which almost certainly will have a greater wing loading. While the MIG's top speed, around 450 mph, is inferior to that of the F-56, its actual climb rate could be a favorable opponent for the American fighter, and may have the edge in hitting power by means of its longer nose heavier caliber armament—Roy Cross

Photoelastic Study Conducted at IIT

General methods of three-dimensional photoelastic stress analysis are to be developed under the stress of a grant awarded to Dr. Miss M. Probst of Illinois Institute of Technology by the National Advisory Committee for Aeronautics.

► **Done with Light**—Photoelasticity is an experimental method of stress analysis. It relies on the fact that light is bent through transparent materials at objects and is produced a color pattern which is directly related to the internal stresses in the object.

Photoelastic studies have been most generally confined to two-dimensional stress analysis, although a few examples of work have been done with three-dimensional studies. This latter work has been limited to mechanical objects.

Foundation stress of the various problems in the study of the stress pattern produced by the stress pattern of the load have been removed.

Princess Readied For Long-Range Role

Progress with the last Saunders/Roe Princess-300 test British flying boat—indicates that this large liner will be ready for flight trials in the fall or winter of 1951, perhaps as soon as its appearance at the Society of British Aircraft Constructors' Fairbairn display.

Reports are that the second and third Princesses initially should take to the air in the succeeding five-month intervals.

► **Engines Soon**—First of the Bristol Proteus turboprop engines for the craft, which will mount six propellers—four coupled gears and two single—will be delivered before the end of the year. Complete engine delivery is slated for the middle of '51.

Meanwhile, a completed unit is being test run as a Princess wing section. And Bristol engineers are working on the Mark III version of the engine, which is expected to reach the speed of the craft in 350 mph, range, no 5500 mi.

Choice of turboprop engines is being referred to by the logical selection for the craft's transport role (Aircraft Week, May 22).

► **Wien, Status**—A indication of the status of the 105-passenger Princess is reflected in an electrical equipment—40 mi. of electric cable, 50 mi. of accessories, 25 acres of light pipe.

The last is complete externally, and some 50 sections have been installed. Water was pumped into the tank when the craft is taken out of the hangar only next year, so will be the last top 30 ft (now high for hangar).

► **Plans Made**—British Overseas Airways Corp., meanwhile, is preparing to put the flying boat into service in 1953 by formation of a group to prepare the last fly-by-line long-haul route with engineering and maintenance equipment to accommodate the Princess.

Another job will be to develop economic and operational data.

► **Route Possibilities**—While electric drive on water will depend on SAARC's light trials, the present transport picture at service time, Saunders/Roe already has studied the possibilities, at times indicating that the craft will be suitable for nearly all routes available to the comparatively smaller Short Seolent. And it estimates the Princess' landing run to almost approximate the Seolent's.

Preliminary route documents indicate that the London-Sydney route, run with single stop at Lagos will require less than 24 hours, for London-Australia about 50 hours, allowing for stops, and another 54 hours to bring in New Zealand.



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Snap-on serves again with a new "Master Supreme" set of four handles, drive extensions, universal joint, and fifteen popular steel sockets. In this 1/2 inch drive set you will find highly engineered design, accurate fit, and a comfortable grip, due results in faster, safer, more satisfactory work. Every tool has a full chrome finish for long service life.

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Over 4000 Snap-on tools are available through 45 direct factory branches located in key industrial areas.

(Snap-on is the trademark of Snap-on Tools Corporation)

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CHEVROLET TRUCK DIVISION General Motors Corporation
DETROIT 2, MICHIGAN



CHEVROLET ADVANCE-DESIGN TRUCKS



This tunnel spray system for simulating icing clouds is NACA's novel method for achieving long data without necessity for flight trials. Each horizontal strut has special air-water nozzles. Controls are located in control section at left end.



Two types of icing test section in Lewis Lab, long tunnel. These instruments are being studied on icing. (Left) Nozzle, (right) Nozzle. These are being studied on icing. (Left) Nozzle, (right) Nozzle.

Icing Clouds Simulated in Tunnel

Research facility develops ingenious spray system to supply data usually obtained in flight trials.

Icing clouds now are being made to order in a wind tunnel to simulate the hazard and expense of pricing icing data by flight research.

Technicians at the Lewis Flight Propulsion Laboratory at the National Advisory Committee for Aeronautics are perfecting tunnel studies to determine icing characteristics and protection requirements of components of all weather aircraft.

As to General: To make sure that simulated conditions in the tunnel would be true to those existing aloft, they first developed special instruments and measured liquid water content and droplet size in natural icing clouds by flight research.

Then they developed an icing tunnel spray system to duplicate these phenomena under controlled conditions.

Special Nozzles—Nozzles were an initial problem. Commercial units couldn't meet the existing, severe conditions of icing research, and drops produced were too large. After a comprehensive study they came up with an air injection type that would give natural conditions.

The nozzle is an air shooting control unit. It carries water through a central passage and ejects it as a solid stream from a very small hole into a high velocity airstream in jet, shooting the water into 5 to 70-micron-diameter droplets.

Regulation of air and water pressure control quantity of water and droplet size to achieve natural icing conditions.

Spray Setup—Next, a spray system was developed to accommodate the nozzle and supply sufficient flexibility to control cloud size, location, uniformity and density.

The scheme incorporates an 80-ft. struts placed horizontally in about 15 ft. increments. The struts have holes for water distribution every 1 in. Because a pattern providing a uniform cloud of specific water content requires a non-symmetrical nozzle pattern, special plans are used to fill the appropriate air openings.

An inner tube in each strut, supplying water to the nozzle, is surrounded by a space for carrying the air. A stream and condensation system is incorporated to prevent freeze-up when tunnel temperatures fall below freezing and the spray system is inoperative.

The water system was about 1800 ft. of water and 4000 ft. of air per hour.

System controls are located in small control sections at the strut ends, with remote operation from the tunnel's main control room.

The tunnel work was conducted by D. R. McIndoe and his associates under supervision of Vera G. Rolfe, Acting Chief of the icing research branch.

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Destroyer... OR Rescuer

From the versatile family of Wright Cyclones comes the power that meets the differing needs of these aircraft... economical power... power ideally suited to long range operations.

► **The Lockheed P2V-4 Neptune**... U. S. Navy long-range patrol bomber... is powered by two Wright Turbo-Cycle 11 compound engines. The descendant of the famous "Twin-Tail Turtle" belongs to its extraordinary warfare operations: great stamina, long range and heavy striking power.

► **The Sikorski HO4S Rescuer**... a Wright Cyclone 9 powers the great 44 foot rotors of this U. S. Air Force's Arctic Rescue Helicopter... which lands so readily on snow and ice as on water or asphalment... without changing the landing gear.

► The six aircraft shown below do other important jobs. Each has its own special power needs—and Wright engines power them all. The future will bring new needs, and Wright engineering and production teams are ready to handle them.



POWER PLANT FOR THE RESCUE — The Wright Cyclone 9 in the Sikorski HO4S is rated at 1750 hp and has a low specific weight of 41 lbs. per hp. Other advantages are... excellent low landing characteristics, service versatility, simplicity of maintenance.

WRIGHT Aeronautical Corporation, Wood-Ridge, N. J.
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Lockheed Constellation



Chase C124 Courier



Boeing Skyraider



North F4U Corsair

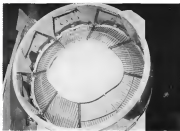


North American B-25 Trader



Northrop C105 Invader





An intake screen for axial flow jet engines. Duct doors are visible in retracted position.

Screens Keep Jet Engines Clean

Axial flow jet engine makers are testing Smith-Morris' latest units; wide application seen.

By George L. Christian

Detroit—The Keston was the first to be an exciting commercial design.

One of the lessons gifting speed to two from jet engine manufacturers is that axial flow engines cannot make complex design, according to T. N. Kelly, designer of one of the first practical, retractable jet air inlet screens.

Kelly, chief engineer of the Smith-Morris Co., Detroit, manufacturer of the screen, told *Aircraft Week* that although the axial flow type jet's vulnerability to debris entering with intake air has been known ever since the engines were first built, the danger of random debris was not brought home until the Keston was.

• **Initial Success**—The prototype model, built in December (1945) to prevent the engine from ingesting foreign matter such as stones and birds, proved so successful that Alcoa wanted more, and Kelly, The USAF and General Electric took note, and as approximately one year Smith-Morris have brought the application of its retractable screen up to this status.

• **Two Alcoa development contracts** have been completed.

• **One USAF development contract** has been completed.

• **Two development contracts** with General Electric and one with A. V. Roe Canada, Ltd. are currently under way. Kelly said that GE had been working on a similar project for some time, but discarded its project after it had experimented with the Smith-Morris unit.

The screen has also been adopted for two additions to the Smith-Morris plant, 825 Myrtle St., Ferndale, a suburb of Detroit.

The company, whose small factory until recently was entirely occupied with the manufacture of high temperature sheet metal products such as jet turbine bellows and aircraft exhaust manifold outlets, got into the screen business as a result of an inquiry from the Power Plant Laboratory, Langley station, Air Material Command, Wright-Patterson AFB.

• **High Strength With Little Interference**—The problem was to build a screen which would keep debris out of axial flow jet engines, be retractable in case long conditions were encountered, strong enough to stand off large pieces of foreign matter, yet interfere as little as possible with air flow and had no suspension of the engine.

Kelly said the problem was difficult to solve, but claims that his latest type of screen meets all 15 percent thrust

loss and 2 percent increase in fuel consumption.

The first three units were built in August, 1949. They did not include duct doors (which close the air intake in case the engine becomes inoperative). The screens were operated by electro-mechanical actuators, and all the screen elements were of the same size. One screen system mounted on top of Mt. Washington, installed in the nose of an Alouette 133. Kelly said it passed the six tests very satisfactorily.

The other two screens were subjected to debris tests. One was finally damaged by throwing a good sized socket wrench into the intake. The surviving linkage did break, but the wrench was kept out of the engine and "you could have continued to search for a while were the engine mounted on an airplane," according to Kelly.

• **Design Improvements**—As a result of these tests, certain deficiencies were found. The electro-mechanical actuators were handicapped because of the great power output requirements and the high speed with which the screens had to be moved (three screens from one extreme position to the other). The personnel realized as actively heavy, cumbersome units, Kelly said. The added that certain arrangements had to be provided. If one or more of the eight individual screen segments stuck, the remaining five units would have to operate, thereby making the electro-mechanical linkage relatively complicated.

The screen needed to impose serious operational restrictions on the engine, indicating that an improved screen element design was needed to permit greater air flow.

No doors were provided to block off the air flow to the engine in case it became desirable at any time to shut it down during flight. (Blocking the air flow will keep the jet engine from "stalling" exactly as burning the powder in an incandescent type power plant.)

Smith-Morris engineers considered these difficulties.

• **Two-Power Hydraulic Actuator**—They developed a small, lightweight hydraulic operating mechanism which had the advantage of providing variable effort to move the screens. High power is required during approximately the first half of the screen's retraction cycle to back the unit free from its which was, by forcing rapidly and slowly the air flow to the second portion of the retraction cycle, a reduction in operating effort is desirable to prevent any extraneous debris

from being separated and damaging the screen or cooling.

The hydraulic actuator designed by Smith-Morris provided the required effort. During the first portion of the actuator's travel, two concentric retracting pistons moved simultaneously. At about the halfway mark, the inner piston bottoms and hydraulic pressure was applied only to the outer piston. By doing the act in two stages pressure was applied gradually in less effort being exerted on the screen, an effort calculated to be low enough to prevent damage by spacing an obstructing piece of debris between screen and cowling.

Since each screen segment was provided with its own actuator, if one became stuck, the others could operate freely.

Added advantages of the hydraulic system according to Smith-Morris, were that it was simpler and lighter than the electro-mechanical counterpart. It developed sufficient power to attract the screen under full test pressure, to break them loose even when fully wet over, yet due to the variable effort factor, did not damage the screen when they retracted with one or other doors clinging to their surfaces.

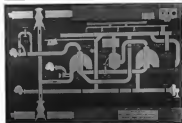
• **Duct Doors Added**—Since it was desirable to provide duct doors to the screen to close off the intake, Smith-Morris engineers designed a set with four subsequent models. The doors are normally retracted out of the way,

lying parallel to the surface of the cowling. They may be extended by actuating the appropriate control and will completely block off air to the jet. An outstanding mechanism is provided which prohibits extension of the doors when the powerplant is operating, thus to avoid inadvertent engine stoppage.

To increase air flow to the engine, six screen elements were designed instead of all elements being the same size and movable screen tubes, the new size, as the new screens, alternate elements were made of taking half the size of the adjacent screen—the result is reduced pressure losses through the screen and improved engine efficiency. If entering doors were sufficiently large, it would bridge the small elements and come into contact with the stronger, lower units. The first and clearest screen were less than three feet.

• **Eight Feet**—In experimental quantities, the screen cost about \$1800 per engine—the cost could be reduced by half if ordered in quantities. Weight of a unit for a 120 to 150 jet engine jet engine is close to 50 lb.

Kelly is enthusiastic about the future potential of Smith-Morris' newest jet engine screen. He said the small flow jet engine will be increasing use as the speed of jet aircraft goes up. And a majority, if not all axial jet engines will eventually be equipped with screens.



Telling the Girls How it Works

American Airlines has adopted this simple and lighter method to help its stewardesses the retractable of the cowling in which they fly. Illustrated is the training aid used in AA's Stewardess school at Chicago Airport to in-

struct the girls on the methods of the Cowling Retracting System. A window panel reveals the landing system of the DC-6. It is manufactured by Technical Training Aid, Inc., in AA's headquarters.

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Starts Jet Engines

A lightweight generator, developed for ground power use such as starting jet engines on aircraft, is being produced by Jack & Hunter Precision Industries, Inc., Cincinnati 1, Ohio. The unit is designed to meet specifications for a constant output of 500 amps, 30 v. d.c., but can handle much larger intermittent loads, supplying 1000 amps for limited periods. The generator operates through a speed of 4800-5000 rpm.

Designed with a flexible coupling, the drive shaft is protected by a friction diaphragm to eliminate dangerous stresses. A shear screw, 4700 in. lb. moment torque, is located between the drive shaft and friction diaphragm.

The new model is equipped with a mounting flange fitting standard AIA 20064 pad. Overall length from mounting flange is 11 in. and diameter is 9.0 in. Casted, anodized and nickel plated, while a self-cooled design is under development.



Airborne Recorder

A small micrograph, designed for recording phenomena under adverse conditions in general aviation, land, guided missile studies and in similar aerospace applications where space is limited, is being developed by Century Co. physical Corp.

The device is built to record data faithfully while well-insulating sections are up to 30°C. It weighs only 11 lb.,

including paper load, and measures 5 x 5 x 31 in. The unit has a precalibrated dial control which permits instant selection of any paper speed from 2 to 12 in. per second changing gears at belts. Supply and timing are controlled in a single detachable, daylight reading unit that weighs 51 lb. of paper or film, 14 in. wide.

The unit will accommodate from 2 to 17 individual recording channels and is equipped with Century's Model 200 photoconverters. It operates on 240 v. d.c. current.

Century also is marketing a larger airborne micrograph, Model 406 (not shown), incorporating equipment not included in the smaller unit. It will carry 280 lb. of paper or film 8 in. wide, weighs 51 lb. and measures 20 x 12 1/2 x 62 in. Address: 1333 N. Union St., Tulsa, Okla.



For Small Airports

A fire truck, indeed specifically to meet the needs of small airports has been developed by the Carlin Corp. It is designed around techniques tested and proven at military fields, the coast guard, etc.

Primary extinguishing medium of the machine, Model MC-710, is low-pressure carbon dioxide, which is not found in a refrigerated storage vessel of 720 lb. capacity. The CO₂ is maintained at a pressure of about 6 psi at the relatively low pressure of 100 psi.

At this temperature and pressure, the liquid carbon dioxide at release reaches about 95 percent CO₂ mass for maximum cooling effect—about compensated by a yield of 24 percent if the extinguisher was stored at a temperature of 80°F.

Another advantage, according to Carlin, is that in areas such as where low pressure storage system are difficult to reach, the truck can be recharged from high-pressure cylinders.

Two tanks, each containing 150 lb. of fire hose with a ploypipe and square valve, permit discharge of the CO₂ at the rate of 150 lb./min./nozzle. "Saw" operation" enables achieve relatively complete ablation of the CO₂ mass and vapor, so that the same can be considered in the portion of the discharge, Carlin says. Also avail-

able are hose-type nozzles for piercing and flooding wing sections or other configurations and extra long ploypipes, which can be built up quickly in sections, for reaching engines or other components.

The truck also carries 300-250 gal. of water and 20-25 gal. of oil from concentrate in separate tanks. Special discharge equipment is installed for these configurations.

The truck may find another important use around small airports and communities. It can be used as a mobile pumping station, since it is equipped with a 200-gpm. pump having a 1/2-in. suction inlet and two 1/2-in. discharge outlets with hose. Address: Bell Bldg., 307 N. Michigan Ave., Chicago 1, Ill.

ALSO ON THE MARKET

Vapor stream cleaning machines, in heavy-duty, portable or stationary models of 100 and 200 gal. capacity, have automatic controls and specially attached cleaning guns with stream shut-off switches, permitting automatic operation. Time-consuming adjustments and need for pre-mixing of cleaning compound are replaced by the clean acid. Made by Sherwin Mfg. Co., 944 Philadelphia Ave., Newark 5, N. J.

Blind flying should be less like plastic used which often has, permitting student to see instrument displays, but presenting him from seeing outside of plane when there is need to compare with an outside picture coming on radio-aided flight. By Van Dusen Aircraft Supply, 2204 Lyndale Ave., S. Minneapolis, Minn.

Leather picking baskets designed to last longer and cut picking time, are resistant to acids and abrasion in addition to being transparent for working loads in action. This type of equipment for deacidifying and chemical processing is being supplied by a large supplier of films, tape and audio. Made by Sealed Air Co., 35516 Western Ave., Cincinnati 18, Ohio.

"Scott's" brand marking tape, marketed for the first time, is a telephone floor type, No. 670, designed by patent. Pile-ups from solvent assembly. The marking tape has permanent adhesive in the back.

Also announced is a white floor marker, type No. 775, designed during World War II. Tape has permanent adhesive on edges only and holds itself in place during marking operation. Made by Minnesota Mining and Mfg. Co., 960 Foshier St., St. Paul 6, Minn.



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New Insurance

Plane and pilot rating plan favors those with good safety marks.

A system of scoring aircraft and pilots on their safety records to award insurance rates for aircraft hull coverage has been developed by the American Aircraft Insurance Co., consultants to the Aircraft Owners and Pilots Assn. The nonexclusive system, available exclusively to AOPA members, gives planes and pilots with the best safety records a better rate than those with less satisfactory marks. "Then America has gotten away from using a calculation overall accident statistics, which could work in a handicap to safe flyers and planes."

How it Works—According to G. C. Whalen, American president, AOPA member planes in the future will be subjected to a check list procedure rating them "debit and credit," with each plane's score under the new system automatically determining the premium rate to be charged. Credits allowed by the company include:

- pilot experience;
- the constant hangar where the plane is permanently stored;
- favorable geographic location;
- AOPA-approved stall-warning system installation;
- pilot's previous safety record, and occupancy;
- average number of hours per year the plane is used.

Debits are scored against planes flown by students, airplanes at airports, use of home airports not conforming with maximum CAA (classification) requirements, and for the difference between a plane's list price and its insured value.

Worms Are Turned By Aerial Dusters

Some 150 cropduster planes from 14 states flew an emergency mission recently to the "bollworm" section of southeast Missouri to save its cotton crop from a sudden invasion of cotton bollworm. The dusters came from as far away as New York, California and Florida.

Planes met necessary pilots at the airports with each in hand-plowing his first turn for their fields. Some operations covered as much as 1400 acres a day, flying down to 400 ft.

The worst began Sept. 15, after a two-week aerial bombardment of crops and dust. Majority of the aerial equipment undoubtedly used a large and valuable cotton crop, CAA observers commented.

Plane Deal Approved

(McGraw-Hill World News)
Rio de Janeiro—Transfer of \$300,000 to the U. S. for payment covering purchase of American lightplanes to be used by Brazil's government-sponsored aero club has been approved by presidential signature. Most of the funds will go to cover training planes already ordered from Piper Aircraft.

BRIEFING FOR DEALERS AND DISTRIBUTORS

Pilot Exam Changes—CAA is considering major changes in knowledge, experience and skill requirements for private pilot certification. The agency is contemplating consideration of written exam, increased cross-country training, and a new flight test.

School Trade Heads—The 20 yr. old

Metall Flying Service, Toledo, has been sold by Tony Mettall to Harry Mettall and Ken Calkbren, who will operate the school under the same name with expanded facilities. The new owners have signed a 17-yr. lease with the city at \$1000 per year plus three cents per each gallon of aviation gas sold.

September Shipments Down—Shipments of 157 took place in June and 166 one- and two-place personal and executive planes during September by eleven builders marked a drop over the previous month when ten builders shipped 244 each. Dollar value for September was also down from August 21, 592,000 compared with \$2,021,190. Cessna was by far the biggest shipper, with 101 planes.

No More Encroaches in '50—The military aviation and the building now held by Engineering & Research Corp., Encroaches, are two reasons given by distributor Sanders Aviation as preventing further production of the two-place plane. The Encroaches production line has been moved to make room for military work. Sanders states there are enough spare parts.

Fedmat Adds New Base—A full-scale aircraft sales and service operation and wholesale plane parts distribution center is being set up at Norfolk Municipal Airport, Norfolk, Va., by Fedmat Aviation, Inc., Winston-Salem, N. C.



COMMERCIALS FROM ON HIGH

A method of delivering commercial broadcasts from the air has been modified out by Max Goldstein building him to give full attention to piloting while handling his assignment. Goldstein has developed a needle on the wing panel which will not jump out of the steel groove because of vibration in motion of the plane. The pilot

operates from a T25, history and has a 1500 sq. ft. cabin. The needles, mounted on the fuselage, are on three units of 250, each, and has a suitable range of over two miles from 1000 ft. altitude. The complete unit weighs only 150 lb. and costs less than \$100 using same membranes parts. A hand scale is fitted for spot measurements.

Airline Credit Is on the Upswing

Carriers' good standing is indicated by interest on EAL's \$30-million loan; rate is same paid by GE.

Airline credit is currently well regarded as reflected by the recent announcement that several banks are competing for Eastern Air Lines.

Eastern received a \$70-million five-year bank credit from a group of 27 banks, headed by the Citic National Bank of New York. The entire amount will be available over a two-year period, under revolving credit being bearing interest at 24 percent with a 1 percent commitment fee applying to the unused balance. At the end of the two-year period, the amount of the loan, outstanding at the time will be funded over three years at a 24-percent interest rate with payments scheduled in twelve equal quarterly installments.

The short-term loan at the same interest rate is an airline credit when it is reduced that prime corporate bond loans, such as to General Electric, for example, are made on a 24-percent interest basis.

In recent years, there has been a tendency for interest rates to firm up over the levels existing previously. For example, in December, 1946, Eastern accepted a \$50-million extended bank credit. The maximum amount of the loan under this arrangement, however, was \$36 million as of Dec. 31, 1948, made available at an interest rate of only 12 percent. It is estimated that Eastern's standing even 36 months after the initial bank agreement with quarterly payments of \$1,311,133 scheduled up to Jan. 2, 1951, has by relative date.

New Equipment Program.—The current \$70-million credit will be applied to finance Eastern's \$40-million new equipment program consisting of the purchase of 32 Martin 40-4s and 14 Lockheed Super Constellation. As one of these aircraft will be delivered annually in 1951, it is unlikely that the company will draw down much of its new credit until that time. It is possible, however, that Eastern, to offset paying the commitment fee for unused balances, may draw down considerable funds and invest them profitably in prime short-term marketable securities. It did do, to a degree, under its earlier bank credit.

Bank credits are playing an increasing role in financing equipment purchases. United Air Lines, in its February, 1947 financing, was able to arrange a \$25-million revolving bank credit at an

interest rate of only 14 percent. On July 1, 1949, as provided in the agreement, the entire outstanding credit, at the amount of \$25 million was funded on a five-year loan at a 2 percent interest rate payable in 20 equal consecutive quarterly installments. Under this schedule the bank loan will be completely retired by July 1, 1951.

Delta obtained a \$5 million bank credit on Nov. 16, 1946, which was funded on a 36-month interest basis due in equal quarterly payments of \$138,000 on Jan. 5, 1948. As of June 30, 1948, Delta owed a total of \$7,975,800 under that loan agreement.

Boeing received a \$6 million bank credit on Jan. 30, 1947, to finance its equipment acquisition program. This loan was funded on Dec. 31, 1947, with payments scheduled over 22 equal quarterly installments, starting Sept. 30, 1948. The interest rate on this advance was 24 percent. As when aircraft were sold, this loan was reduced by the proceeds of such sales with the subsequent reduction in the per cent installments scheduled. As of Aug. 31, 1950, Boeing owed \$5,613,535 under this plan.

Western, unable to obtain normal banking accommodations, was forced to seek aid from the Reconstruction Finance Corp. During 1947 and 1948, Western obtained a total of \$6,421,645 in RFC loans at an interest rate of 4 percent. Moreover, this obligation is secured by virtually all of Western's assets and entails a number of restrictive conditions in the company's financial operations. As of June 30, 1950, this indebtedness has been reduced to \$1,062,737. As the credit of the carrier improves, it could possibly refund this government loan through bank credits if a commercial lender were ready.

Northwest, unable to obtain needed funds from banks on its own credit standing, obtained financial assistance through the new controversial RFC-guaranteed loan. Under this arrangement, out of a total \$21-million credit, the RFC guaranteed the banks against loss to the extent of \$12 million. As of June 30, 1950, a total of \$9,718,351 of this loan was outstanding. The interest cost on this advance is 4 percent. Northwest, then, the carrier has pledged much of its assets and is bound by various restrictive provisions.

Its government obligation is currently

paying interest on view of Northwest's recent action in paying \$325,000 in deferred and current dividends on its preference shares. Faced with a reduction in asset pay, this dividend action may lead to further requests by a Senate group looking into RFC loans.

A Capital Deal.—Probably the best financing deal in recent times, arranged by an airline to acquire equipment, goes to Capital Airlines.

In acquiring a total of five used Constellation from Lockheed Aircraft Corp., Capital obtained a novel purchase arrangement. As this Lockheed equipment loan was received, Capital has issued promissory notes payable to the aircraft company representing the balance of the purchase price due on three dates. These notes are noninterest-bearing and are payable in monthly installments over a period of 31 to 35 months beginning with the first day of the second month following dates of delivery. These notes are secured by a chattel mortgage on the equipment.

At the time this deal was made, Lockheed evidently was anxious to facilitate matters, in the disposition of the Constellation now owned by Capital led to the sale of new planes to a foreign carrier. No bank was possibly involved on the terms of this deal.

TWA, scheduled to take delivery of 40 Martin 40-4s and six more Lockheed Constellation starting next year, is believed to have worked out the details of a chattel mortgage arrangement to finance these purchases. Premised on previous agreements of a similar nature, TWA may make a down payment of about 25 percent. The banks would finance the balance with amortization payments over a period of years.

For example, in purchasing 20 Lockheed 40-4s, Constellation last year's deliveries starting Aug. 10, 1949, and scheduled for completion by January, 1951—TWA made advance payments of \$1 million toward this order price. Up to a maximum of \$12 million was made available by a group of seven banks at an interest rate of 3 percent. The TWA financing was accomplished after certain restrictive features of aircraft leasing, the definitions of "aircraft" by the Federal Life Assurance Society were modified.

Bank loans are expected to be employed in facilitating projected aircraft acquisition programs by Pan American, Chicago & Southern and Mid-Continent.

Major purchases of aircraft scheduled for 1951 delivery by American and United have already been provided without need of additional borrowing. With its maximum credit increasing, banking accommodations to finance aircraft purchases for the permanently certificated air carrier appear now to be readily available. —Selig Abraham

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Yet he fails to take the simple precaution of a Chest X-Ray to make sure he does not have tuberculosis. But because he's opposed to the X-Ray. Simply because he is not sufficiently informed—or just hasn't taken the time and trouble, or does not realize the seriousness of the problem.

A Chest X-Ray is the first step toward detecting tuberculosis in its early stages. And in its early stages it can be cured with the least loss of time from work.

So, if you're the man above, that one simple reason should make you get your Chest X-Ray—today. But listen, see how serious this really is:

Between the ages of 15 and 34, tuberculosis leads all other diseases as a cause of death—although at no age are you safe from TB. Yet, if everyone does his part by getting a Chest X-Ray periodically, and the majority of cases thus discovered are followed up, we can eliminate TB entirely as a public health hazard!

Will you do your part today? Get a Chest X-Ray. It may mean your life!

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AIR TRANSPORT

Trunkline Traffic Rise

Sept. Passengers Mm. Sept. Revenue Tm. Mm.

	1959	1960	Percent Change	1959	1960	Percent Change
American	120,770	132,000	+9.3	\$10,910,000	\$12,100,000	+10.9
Boeing	10,000	10,000	0	1,000,000	1,000,000	0
Continental	10,000	10,000	0	1,000,000	1,000,000	0
Eastern	10,000	10,000	0	1,000,000	1,000,000	0
Northwest	10,000	10,000	0	1,000,000	1,000,000	0
Southwest	10,000	10,000	0	1,000,000	1,000,000	0
TWA	10,000	10,000	0	1,000,000	1,000,000	0
United	10,000	10,000	0	1,000,000	1,000,000	0
Western	10,000	10,000	0	1,000,000	1,000,000	0

January-August Totals

All in millions 8,279,176 8,881,071 +7.3 \$1,042,000 \$1,110,000 +6.6

good as June, the best month in history." All types of traffic are up slowly over last year. And Washington traffic in October was 30 percent over a year ago. American's schedule compilation factor was over 95 percent for the system in October.

• **Three World Airlines** says "October was a satisfactory month—and the best October ever!"

• **Earnings Rise:** Fokker-Earnings are going up more than traffic, as load factors improve. For example, United Air Lines made the best income record for any quarter in its history the third quarter of this year, with a net profit of \$4,234,276 after all taxes. Cost per revenue mile was down 7 percent on traffic revenue of over 15 percent.

Average domestic trunkline overtook the first half of this year with up 7 percent and operating income rose 10 percent, to \$15,559,200. Then July revenue of \$46,915,000, a 12 percent gain over 1959, brought a 10 percent increase in operating income—\$6,952,000. As gain revenue gain of 79 percent to \$48, 10,000 yielded a 151 percent gain in operating income over last year. The \$1,851,000 operating gain of August was more than double a year ago, at a revenue gain of 19 percent.

But when average load factors push above 65 percent, the airlines start shedding problems. For example, domestic flights are filled to capacity. That's what has added emphasis to the big demand for new equipment in the fall.

Average load factor for the Big Four—American, Eastern, TWA and United—increased rapidly this summer, from 65 percent for the first half, to 69 per cent in July, to 72 percent in August.

• **American Record:** First quarter income went several years in. How much of this traffic increase is seasonal growth, and how much is owing to Korea war and general defense mobilization activity?

The airlines seem to put their faith in seasonal growth of this traffic market—passenger and cargo. U. S. scheduled airlines have already ordered

195 new airplane planes for delivery next year. They will pay part of the \$127 million cost out of currently improved earnings. But a huge share of the money must be borrowed, as talks out of working capital. This money has in the future revenues and profits.

One way to gauge how much of the traffic gain is not seasonal is to look at 1959 first-quarter results. January through June, the trunkline had total revenue of \$248,331,000 the first half of 7 percent over last year. Third-quarter revenue per mile rose to 15 percent as more over last year. The third quarter saw a war mobilization impact, with some added traffic early coming from non-military emergency travel, non-military family travel, and war and security-related travel. The high level of mobilization was based on the high national revenue, partly also a result of mobilization.

Set a conservative estimate might

still place this fall's normal traffic growth at 7 percent, which is the 1959 pre-Korea average improvement over 1949. But even here, it must be remembered that the first half of this year was an ordinary boom, generally speaking, while the first half of 1949 was a minor business recession.

Many observers, including some Civil Aeronautics Board commissioners believe people, nevertheless say they think all about all this fall's heavy traffic has been normal—mostly dependent on good or some plus regular airline travel growth. Air Transport Association estimates research department estimates total domestic trunkline passenger miles may come close to 78 billion when the year is out. That is 19 percent higher than last year.

Original ATA estimate made before outbreak of the Korea war was a 1950 total of 7.4 billion passenger miles. The revised estimate assumes average weather conditions and on rate of total crashes.

- **Boston Municipal**—\$1,371,600
- **Kansas City Municipal**—\$1,160,750
- **Los Angeles International**—\$1,417,812
- **Memphis Municipal**—\$1,460,000
- **Minneapolis International**—\$1,357,768
- **Missoula, General Municipal**—\$1,800,000
- **Newark Municipal**—\$1,300,000
- **New York International**—\$1,330,000
- **Philadelphia International**—\$1,300,000
- **Phoenix, Sky Harbor**—\$1,362,800
- **San Francisco Airport**—\$1,378,738
- **San Jose, Puerto Rico International**—\$1,000,000
- **Shreveport Municipal No. 2**—\$1,340,000
- **Texas County Municipal**—\$1,677,170

There are the larger programs for 1951. The sponsoring cities provide a larger proportion of the money on many of these than is usual on the smaller airports.

• **How CAA Gives It:** When Division Chief Paul Stafford got his first 1951 federal aid contribution of \$21,200,000, he and his fellow planners divided 75 percent of a total \$15.5 million membership by funds to each state.

The formula is based on each state's population and area. Thus, Alabama has 1.66467 percent of the nation's area. It has 2,157,073 percent of the nation's population. Add up the two figures and divide by two and you find Alabama gets 1.91805 percent of the federal report and appropriation for 1951.

After CAA portions out the 75 percent of its total aid by that formula, it has 25 percent, or about \$5 million

Airport Construction Program

Fiscal year	Federal contribution (100,000 rounded)	State and local expenditures (100,000 rounded)
1947	\$17.9	\$17.7
1948	18.8	18.8
1949	35.1	38.7
1950	27.5	37.4
1951	21.2	33.9

Where Federal-Aid Cash Will Go

Civil Aeronautics Administration Donald Nease has announced how CAA will divide its \$26,678,910 federal funds to states and territories for fiscal 1951 construction and lighting at 165 airports.

State and local agencies are estimating the CAA contribution with \$26, 164,708 of their own. That brings the total 1951 federal aid support construction and lighting program to \$51,833, 618.

Of the federal money, \$5.5 million is airport money carried over from 1950, and \$21.2 million is new cash and contract authority.

The total 1951 federal grant of \$26.6 million is part \$15.5 million less than CAA Director of Airports Phillips Mason and Chief of Airports Planning Division Paul Stafford had asked for, before the Budget Bureau studied their requests almost in full.

- **Construction Phase:** Here are construction and lighting plan of some of the 156 airports for fiscal 1951 (federal plan local funds).
- **Boston, General E. L. Logan**—\$1, 800,000.



COMANDO TACTICS

A title of C-119s on being fired into a C-119. C-119 of Cape Canaveral, Fla., at Wright, Fla., the delivery to Chicago. The next plane flew the

run from Cape Canaveral, Florida, to Cape Canaveral, Fla., the delivery to Chicago. The next plane flew the

Business Good and Getting Better

Whatever the cause—defense mobilization or normal growth—the airlines are way ahead of last year.

Passenger and cargo are moving over the nation's air trunklines at record volume. October reports show strong improvements over 1949, both passenger and cargo. And estimates say that November traffic will continue to show big gains over last year.

September gains averaged 15.33 percent. This is more of an improvement over 1949 than 1950's last eight months, which averaged 15 percent better than last year.

• **Business Is Good:** Here are some comments from airlines in reply to Aviation Week's question, "How's business?"

• **United Air Lines** says last month was "the best October on record, both passenger miles and cargo ton miles, and this month looks like an even better November."

• **National Airlines** says "Florida traffic well exceed all previous years." That's

based on hotel bookings, as well as other indicators. October figures "adequate a record or near-record traffic month for the early fall season. Load factor was up 93 percent." (From 45 percent a year ago). Passenger miles of 15,490,000 were up 34 percent over the same month of 1949. This was with an increase of only 1.5 percent in average miles operated and no increase in available seat miles of only 10 percent.

• **Capital Airlines** says November traffic looks promising, especially through non-scheduled Washington. October passenger miles of the system were up 27 percent over a year ago to 43,911,800. That's a 100-percent increase over September.

• **Eastern Air Lines** says traffic is very good. Washington volume broke all records in October.

• **American Airlines** says the same thing. Estimates show October was at least "a



ALL FOR ONE AT LANSING

and when in Chicago for next day. Shows at Lansing's Capital City Airport are few of the clustered plans—Capital DC-4,

Norfolk 3-2-2, American DC-6, United DC-4 and United DC-4. An outstanding example of building design produced

Combined with of seven planes provided by an airline from 1950. Meanwhile, down to four company's Lansing, Mich., plane



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lines are going after it, the odds of people now getting it seemed paid value of two to three weeks.

UN Group Sets Up Travel Research Unit

International air carriers may be the biggest games in the travel industry and competition to be shared soon by a United Nations consultative body, the International Union of Official Travel Organizations (IUOTO).

IUOTO is setting up a group called the International Scientific Travel Research Institute to prepare for "development of new methods, new methods, and scientific analysis of facts relating to the international travel industry." President of IUOTO, Dr. Eilert A. Williams, says travel-related studies economically will be aimed to serve on the Travel Research Institute.

Q & A Sessions With Boss in UAL News

"Why is American Airlines lagging ahead of United Air Lines in passenger traffic and operating profit?" That is a United employee question put to United President W. A. Patterson in the last's house organ.

Patterson's answer: The two lines "differ in character of traffic and recovery strategy. For example, American has an advantage in that it has a greater concentration of mileage in the eastern United States where air travel is more at its highest density. United has more national travel and, therefore, more wide fluctuations in greater than American's. United's business fluctuates about 45 percent between the yearly high and low while American's fluctuates in about 25 percent.

"Still another factor in American's growth has been introduction of Convair planes which have made possible on competitive north-south routes using DC-3 equipment. For example, American has joined on the New York-Washington, Boston-New York, and similar segments in competition with Pan Am, Chicago & Southern, Braniff, and others."

"Next question: The next employee question deals with United's DC-3 fleet."

"Could the advertising department put out some copy that would help sell the DC-3?"

Patterson's answer: "The DC-3 seems relatively small today as rates when airports are not adequate for larger equipment. I don't think the rest of a year concentrated advertising of the DC-3, beyond our present program in local areas, would bring results in proportion to the added expense."

►United Equipment Outlets—United has a good stock of DC-3s on order with 32 DC-3s set for delivery next year and the year after. The cost of that order may prove) any modernization of its two-engine fleet for some time.

The company is converting since DC-3s fly every 48 passengers instead of 44, that order could be a big saving a substantial number of Super DC-3s (perhaps 30) are now deferred. Cost of the 32 DC-3s will now be around \$20 million.

The company plans to use DC-3s to replace DC-4s on passenger routes.

CAB Turns Down TTA Excursion Rates

Trans-Texas Airways cannot cut its 4-emb-emb "excursion fare" program for its scheduled excursions in southern Texas, the Civil Aeronautics Board ruled. The excursions has a 30-day round trip limit. It is 27 percent less than a regular roundtrip fare.

The Board says that Trans-Texas Airways is being hit hard by Braniff using an excursion fare that gives as low as 1-2 cents a mile over the regular fare from San Antonio to Laredo. For an air fare of \$13.50, Braniff, \$13.50 for Trans-Texas "excursions." But, says the Board, the Trans-Texas fare has under investigation.

Regulation of the Board's decision is that Trans-Texas will soon have to put its excursion fare to 44 cents a mile and limit the trip duration to three days.

And if Braniff flies for a single 44 cent mile instead of the CAB-dictated 44 cent, Braniff will probably get it without having to go through hearings and Board decisions.

►Braniff Fleet—Braniff filed for the lower fare market it has suffered a substantial passenger traffic decline on the so-called short-hauls of its route in southern Texas-Laredo, San Antonio, Corpus Christi, Brownsville, Houston and Galveston. For instance, between April 1959 based on the Houston-Galveston DC-3 run was 5 passengers. Braniff attributes that low traffic to two causes.

►Declining importance of Laredo and Brownsville as international gate ways.

►Trans-Texas competition at lower fares.

Braniff Air Lines complained that the proposed fare was below cost, unprofitable on basis of seasonal fluctuations, and ineffective in attracting additional new traffic to compensate for revenue loss per passenger. Further complaint on the Houstonville, Corpus Christi and Brownsville segments.

SHORTLINES

►Air Lines—In Air Line plan to keep all its routes open this winter as long as the seasonal flying level allows. However, the company's success on its Dallas-London route is waning.

►Air Coach Transport Area—Going has opened a Washington office, headquarters for President Angus Hancock, who is fighting for the large regular routes. They are presently limited to state flights in the Southwest and two major cities. Office is at Suite 510, Third Floor, Washington.

►Air France—Company departure times at Fifth Avenue, New York, has the first wide-world flight insurance-dispatching machine. Continental Company Co. produces cost program on Air France flights in any part of its network, and on any connecting service.

►Alaska Airlines—Alaska network shows a profit of \$174,000 before depreciation for the 11 months to Sept. 30. Chairman of the Board Raymond Marshall predicts a better final showing for the first year after next year's second month. Last year the loss was \$1,522, 165.

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AVIATION WEEK, November 12, 1956

EDITORIAL

Higher Plane Prices

A startling claim that aircraft prices have soared 257 percent since Korea is made by one Murray D. Lincoln of Columbus, O. He said so before the convocation of the co-operative league of the U. S. A. Mr. Lincoln was speaking as president of his group. He is also a member of the National Mobilization Policy Committee of the National Security Resources Board.

When Mr. Lincoln's statement first appeared in the Los Angeles Times, we assumed the figure was a typographical error. A careful check discloses that the figure appeared in Mr. Lincoln's manuscript and was so delivered. Written inquiry to Mr. Lincoln as to his failure to bring a reply regarding the source of the associative statistic.

If Mr. Lincoln had delved deeper into the subject, he would have learned that unit costs of planes constructed for since the Korean outbreak have actually gone down because of the larger numbers of aircraft ordered. So far this fiscal year the Air Force, for example, has contracted for these items at many places as were ordered under the entire fiscal 1950 appropriation.

Under Secretary McCone of the USAF in recent testimony to Capitol Hill said that various increased prices in raw materials used in aircraft, plus probable wage increases, would soon increase the price of planes bought by the Air Force by 7 to 8 percent. But that would occur in the future. It has not yet occurred.

The latest authentic information on the subject was issued recently by the Aircraft Industries Association. The AIA reported that the total increase in aircraft prices over the past 10 years was 145 percent, comparing with an increase over the same period of 733 percent for tanks and 471 percent for destroyers. At AIA points out, the 1950 airplane will fly twice as fast as its 1939 predecessor, has a range almost twice as great, and carries far more complicated and costly instruments than the 1939 airplane.

Mr. McCone's estimate of a 7-to-8-percent increase in the near future, and the AIA's 143-percent increase over the past 10 years, are in wild conflict with Mr. Lincoln's claim of a 267-percent jump since June 25. We hope his "estimate" gets no further circulation without supporting proof, which as far has not been forthcoming.

Pity the Traveling Salesman

Two savvy companies in our aviation industry are likely to consider the visiting traveling salesman more a pest than someone who might save them money or offer a needed product. Our questionnaire traveling salesmen recently avoided two aviation companies, at least, who can never be accused of discouraging new ideas.

from their windows, and it is gratifying to give both of them publicity on the page.

At Wichita, while visiting Cessna Aircraft Co., we could not help noting a neat plaque at the company's main executive entrance of the plant. It says "welcome welcome."

At United Air Lines' expensive maintenance and overhaul base at San Francisco there is a big sign, in red, we believe, announcing in giant letters visible all the way across the parking lot that all sales representatives will find a welcome there.

This is in the American business tradition—a constant effort by management to find cheaper, better ways of doing the job. **Robert H. Wood**

He's Burned Up?

(A Letter From a Reader)

I take your magazine. To me it is a fan magazine and I read it every week except to cover but when I get to your editorial page I really learn.

I am the owner of a 196 rubber arch racing plane (Kline string No. 16). To me your editorial's against these ships and the runs and shows we put on. I don't see your writing anything about 50 people killed in a plane crash on the river or 35 killed in a Canyon crash. Whereas it cost no money

You always bring up Bill Odom's crash at Cleveland. Well I was there along with some of the best pilots in the country (Tim Le Viet, Horvath "Fish" Salmon and Joe DeBona).

Flaming Crash Kills Stunt Flier

Deposited Press

ROSBURG, Va., Oct. 30—A 54-year-old stunt flyer plotting a long aerobatic plans he declared and built himself, crashed to a fiery death here yesterday before 38,000 spectators.

Charles Edward Bailey, of Madison, N. O., had landed the crowd at Municipal Airport and aerial acrobatics for 15 minutes before the fall landing.

we all were filling up and I would say there were only twenty people at the most seen him go in and not 90,000 like you say. So much for that. These 190 cubic inch planes are doing very much toward and for the good of aviation. Look at the 85 h.p. Coet engines. The engine is really working out. The airplanes are designed by some of the best engineers in the business.

Your last editorial quote (How much longer will we continue to waste deliberate invitations to death?) suggests. Did you think very much or very hard before you wrote this line? Why don't you come out and meet some of the boys and look the ships over and then think of that one line all over again. I would like you to put this in your letter to the editor please.

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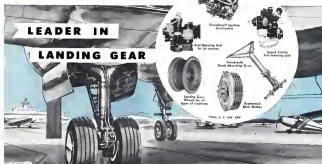
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